Comparing Gameplay Across Formal and Informal Contexts

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INTRODUCTION

Simulations and strategy games are brought into learning environments to provide an engaging way for players to interact with phenomena that are otherwise impossible to observe (Anderson & Barnett, 2013). That said, little is known about how gameplay differs between formal and informal contexts, even within the same game or same population (Kenny & McDaniel, 2011). For instance, when playing a video game for entertainment or leisure, players can freely explore the game's environment and gameplay strategies; when playing as part of a class or as an organized event, external goals and instructions may influence how players approach the game. In this paper, we present an examination of gameplay across formal and informal contexts to open a discussion about the complex interaction between game design, context, and gameplay.

DATA

We collected (anonymized) gameplay data from 42 middle school-aged students (10-14) participating in an educational game event, *Game-a-Palooza* (GAP) via the Assessment Data Aggregator for Game Environments (ADAGE; Stenerson et al., 2014). In part, GAP structured time for students to play *Virulent* (GLS Studios, 2011), a real-time strategy game in which players take the perspective of a virus invading a host. "Formal" gameplay data was collected during 90-minute *Virulent* sessions with a structured curriculum led by facilitators each day for 5 days. "Informal" gameplay occurred anytime outside of the event sessions, including GAP free-play time and while playing at home each evening.

In this analysis, gameplay is quantified by the frequency of the different actions players perform in the game, including creating paths, changing paths, spawning units, and upgrading units. Frequencies of these play-behaviors were compared between data collected during the formal and informal periods, correcting for the proportion of play in each. 10 of 42 students were excluded from our current analysis due to out of session connectivity/logging issues.

Proceedings of 1st International Joint Conference of DiGRA and FDG

RESULTS

Overall, our initial comparisons did not reveal significant differences between formal and informal play. As seen in Figure 1, the amount of time played in the formal context was directly related to the time played informally, $r(30) = 0.38$, $p = 0.03$. T-test comparisons of player actions found no evidence to suggest that context influenced the rate of players creating paths, $t(32) = -0.27$, $p = 0.79$; changing paths, $t(32) = 0.21$, $p = 0.84$; or spawning units, $t(32) = 0.67$, $p = 0.51$. Upgrading units was an infrequent action overall but showed the largest relative difference between contexts $t(32) = -1.96$, $p = 0.05$.

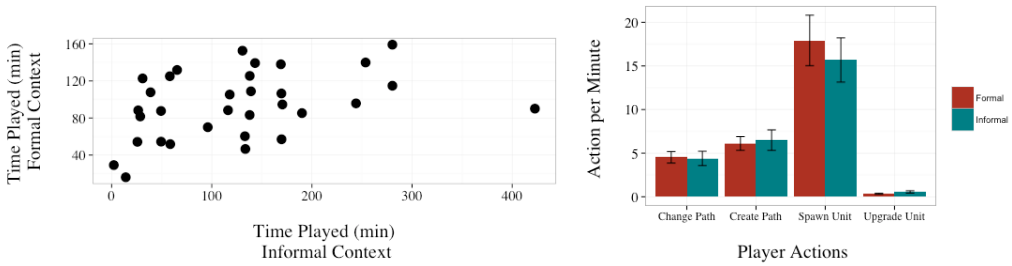

Figure 1: (Left) Time played was positively related across contexts. (Right) Comparisons of player actions do not reveal consistent differences across contexts.

DISCUSSION

Against our predictions, the surprising similarities between formal and informal gameplay in our data present interesting observations regarding how video games can be integrated into formal learning settings. While the timing and pace of formal gameplay was scheduled according to the *Virulent* sessions' curricula, players were not limited by the strategies they could use in the game. Furthermore, introducing the game in a collaborative formal environment with their peers may have established patterns of gameplay that players continued outside of the structured sessions. The game design of *Virulent* presents a diversity of challenging levels that encourage the exploration of strategies, but ultimately completing levels may lead to a convergence of strategies across players and contexts. Together, these characteristics of GAP's implementation and *Virulent*'s design may exemplify the conditions under which we would predict gameplay pace and strategies to be consistent in formal and informal settings. Nevertheless, further analysis is necessary to determine whether other factors of gameplay, such persistence to complete challenging levels or exploration of strategies, are similarly consistent across formal and informal contexts.

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